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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TRAN, KHANH C

ART UNIT	PAPER NUMBER
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2631

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/701,047	XIA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Khanh Tran	2631	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 June 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5,7-9,12-31,33-36 and 38-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-31,33-36 and 38-53 is/are allowed.
- 6) ☒ Claim(s) 1 and 7 is/are rejected.
- 7) ☒ Claim(s) 2-5,8 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/04/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

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### **DETAILED ACTION**

1. The Amendment filed on 06/13/2005 has been entered. Claims 1-5, 7-9, 12-31, 33-36, 38-53 are pending in this Office action.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1-5, 7-9, 12-31, 33-36, 38-53 have been considered but are moot in view of the new ground(s) of rejection.

3. The objection of claims 7, 12, 14-17, 19-21, 41, 45, 49 and 50 has been withdrawn after claims were corrected for the informalities.

4. The amendment of the Specification filed on 06/16/2005 has been accepted.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claim 1 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,829,297 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

**claim 1 of the application claims** "an adaptive equalizer comprising: a decision device producing a decision device output; a decision feedback equalizer coupled to the decision device, the decision feedback equalizer producing a decision feedback output; an FIR filter coupled to the decision device; and a trellis decoder coupled to the decision device, the trellis decoder producing a reliability output and a decoded output; wherein an error signal is generated by subtracting the decision feedback output from the decision device output, the error signal being used to update coefficients of the taps of the FIR filter and the decision feedback equalizer; and wherein a magnitude of the change to the coefficients is selected based at least in part on the reliability output of the trellis decoder".

**claim 1 of the US Patent claims** "An adaptive equalizer comprising: a decision device; an FIR filter coupled to the decision device; a DFE coupled to the decision device, the DFE producing a DFE output; a Viterbi decoder coupled to the decision device, the Viterbi decoder producing a reliability output and a decoded output; a mapper coupled to receive the decoded output of the Viterbi decoder and to generate a mapped and scaled output; wherein the error signal is generated by delaying the DFE

output by a number of cycles equal to a number of cycles the Viterbi decoder uses to generate the reliability output and subtracting the delayed decoded output of the DFE from the mapped and sealed output of the mapper; wherein a magnitude of change in the coefficient of the adaptive equalizer is selected based at least in part upon the reliability output and at least in part upon the error signal".

**Prima facie case of obviousness:**

Claim 1 of the application differs from claim 1 of the US Patent in that claim 1 of the application uses a trellis decoder while claim 1 of the US Patent uses a Viterbi decoder. However, as disclosed by Applicants in the original disclosure on pages 7, lines 9-12, the trellis decoder uses a Viterbi algorithm to decode the signal encoded by the 8 VSB trellis encoder. In view of the foregoing, one of ordinary skill in the art at the time of the invention would have recognized the interchangeability of the Viterbi decoder specified in the US Patent for the trellis decoder as specified in the application claim.

Furthermore, claim 1 of the application omits the claimed limitations "by delaying the DFE output by a number of cycles equal to a number of cycles the Viterbi decoder uses to generate the reliability output and subtracting the delayed decoded output of the DFE from the mapped and sealed output of the mapper" claimed in the US patent.

Because omission elements in the claim would make the claim broader in the instant application, hence, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the claim in the instant application is merely an obvious variation of the claim in the US patent. In light of the foregoing discussion,

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broad claim in the instant application is rejected as obvious double patenting over previously patented narrow claim.

6. Claim 7 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,829,297 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

**claim 7 of the application claims** “an adaptive equalizer comprising: a decision device; an FIR filter coupled to the decision device; a decision feedback equalizer coupled to the decision device, the decision feedback equalizer producing a decision feedback output; a trellis decoder coupled to the decision device, the trellis decoder producing a reliability output and a decoded output; wherein an error signal is generated by delaying the decision feedback output and subtracting it from the decoded output; and wherein a magnitude of change in coefficients of the taps of the FIR filter and the decision feedback equalizer is selected based at least in part upon the reliability output”.

**claim 1 of the US Patent claims** “an adaptive equalizer comprising: a decision device; an FIR filter coupled to the decision device; a DFE coupled to the decision device, the DFE producing a DFE output; a Viterbi decoder coupled to the decision device, the Viterbi decoder producing a reliability output and a decoded output; a mapper coupled to receive the decoded output of the Viterbi decoder and to generate a mapped and scaled output; wherein the error signal is generated by delaying the DFE

output by a number of cycles equal to a number of cycles the Viterbi decoder uses to generate the reliability output and subtracting the delayed decoded output of the DFE from the mapped and sealed output of the mapper; wherein a magnitude of change in the coefficient of the adaptive equalizer is selected based at least in part upon the reliability output and at least in part upon the error signal".

**Prima facie case of obviousness:**

Claim 7 of the application differs from claim 1 of the US Patent in that claim 7 of the application uses a trellis decoder while claim 1 of the US Patent uses a Viterbi decoder. However, as disclosed by Applicants in the original disclosure on pages 7, lines 9-12, the trellis decoder uses a Viterbi algorithm to decode the signal encoded by the 8 VSB trellis encoder. In view of the foregoing, one of ordinary skill in the art at the time of the invention would have recognized the interchangeability of the Viterbi decoder specified in the US Patent for the trellis decoder as specified in the application claim.

Furthermore, claim 7 of the application omits the claimed limitations "by delaying the DFE output by a number of cycles equal to a number of cycles the Viterbi decoder uses to generate the reliability output and subtracting the delayed decoded output of the DFE from the mapped and sealed output of the mapper" claimed in the US patent.

Because omission elements in the claim would make the claim broader in the instant application, hence, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the claim in the instant application is merely an obvious variation of the claim in the US patent. In light of the foregoing discussion,

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broad claim in the instant application is rejected as obvious double patenting over previously patented narrow claim.

***Allowable Subject Matter***

7. Claims 2-5 and 8-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 12-16 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 12, the claim is allowed over prior art of record since the cited references, taken individually or in combination, fail to particularly disclose an adaptive equalizer comprising uniquely distinct features "a decision error signal created by operably combining the equalizer output signal and the decision device output signal" and "a reliability-decision directed adaptation signal created by operably combining the decision error signal with the symbol reliability output signal". It is noted that the closest prior art, Nicolas et al. (US 5,453,797) and Tan et al. (US 6,226,323 B1), discloses a similar adaptive equalizer, however, fails to anticipate or render the above underlined limitations obvious.

9. Claims 17-21 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 17, the claim is allowed over prior art of record since the cited references, taken individually or in combination, fail to particularly disclose an adaptive equalizer comprising uniquely distinct features "a symbol mapper operably coupled to the error-corrected symbol output signal and providing a mapped and scaled symbol output signal" and "a decision error signal created by operably combining the equalizer output signal and the mapped and scaled symbol output signal" and "a reliability-decision directed adaptation signal created by operably combining the decision error signal with the output of the symbol reliability output". It is noted that the closest prior art, Nicolas et al. (US 5,453,797) and Tan et al. (US 6,226,323 B1), discloses a similar adaptive equalizer, however, fails to anticipate or render the above underlined limitations obvious.

10. Claims 22-30 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 22, the claim is allowed over prior art of record since the cited references, taken individually or in combination, fail to particularly disclose a method for creating a reliability-decision directed adaptation signal for adapting an adaptive equalizer, the method comprising uniquely distinct features "combining operatively the error-corrected symbol output signal and the equalizer output signal to produce a

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decision error signal" and "combining operatively the decision error signal and the symbol reliability output signal to produce the reliability-decision directed adaptation signal". It is noted that the closest prior art, Nicolas et al. (US 5,453,797) and Tan et al. (US 6,226,323 B1), discloses a similar adaptive equalizer, however, fails to anticipate or render the above underlined limitations obvious.

11. Claims 31 and 33-35 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 31, the claim is allowed over prior art of record since the cited references, taken individually or in combination, fail to particularly disclose a method for adapting an adaptive equalizer comprising a plurality of coefficients and a means for adapting the plurality of coefficients, the method comprising the uniquely distinct feature "modifying the step size of the means for adapting the plurality of coefficients in relation to a magnitude of the symbol reliability signal".

12. Claims 36 and 38 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 36, the claim is allowed over prior art of record since the cited references, taken individually or in combination, fail to particularly disclose a method for adapting an adaptive equalizer comprising a plurality of coefficients and a means for

adapting the plurality of coefficients, the method comprising the uniquely distinct features "wherein said symbol reliability signal is operably coupled to the step size" and "wherein the magnitude of the adaptation applied to the plurality of coefficients is governed by the symbol reliability signal".

13. Claims 39-42 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 39, the claim is allowed over prior art of record since the cited references taken individually or in combination fails to particularly disclose a method for creating a reliability-decision directed adaptation signal for adapting an adaptive equalizer, the method comprising uniquely distinct features "operably combining the decision device output signal and the equalizer output signal to create a decision error signal" and "operably combining the decision error signal and the symbol reliability signal to produce the reliability-decision directed adaptation signal". It is noted that the closest prior art, Nicolas et al. (US 5,453,797) and Tan et al. (US 6,226,323 B1), discloses a similar adaptive equalizer, however, fails to anticipate or render the above underlined limitations obvious.

14. Claims 43-48 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 43, the claim is allowed over prior art of record since the cited references taken individually or in combination fails to particularly disclose a method for adapting a response of an adaptive equalizer, the method comprising uniquely distinct features "forming a reliability-decision directed adaptation signal related to the error-corrected decoder symbol signal by operably combining the equalizer output signal, error-corrected decoder symbol signal and the symbol reliability signal". It is noted that the closest prior art, Nicolas et al. (US 5,453,797) and Tan et al. (US 6,226,323 B1), discloses a similar adaptive equalizer, however, fails to anticipate or render the above underlined limitations obvious.

15. Claims 49-53 are allowed.

Regarding claim 49, the claim is allowed over prior art of record since the cited references taken individually or in combination fails to particularly disclose a method for adapting a response of an adaptive equalizer, the method comprising uniquely distinct features "forming a reliability-decision directed adaptation signal related to the error-corrected decoder symbol signal by operably combining the equalizer output signal, error-corrected decoder symbol signal and the symbol reliability signal". It is noted that the closest prior art, Nicolas et al. (US 5,453,797) and Tan et al. (US 6,226,323 B1), discloses a similar adaptive equalizer, however, fails to anticipate or render the above underlined limitations obvious.

**Conclusion**

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

*Khanh Cong Tran*

*08/30/2005*

*Examiner KHANH TRAN*